Chapter 4:
Products and Dissemination

Chapter Contents

Chapter 4: Products and Dissemination

Introduction

The PEPH mission emphasizes engaging partners to work together to communicate scientific findings in a way that is useful to public decision-making, understandable to the public, and appropriate to the culture. PEPH communication products are created to convey environmental health research findings and to suggest how these findings might be translated into public health action. This process involves setting up mechanisms that translate research findings into appropriate messages for target audiences, creating products using these messages, and disseminating these products in order to decrease environmental health risks in communities.

> This chapter focuses on dissemination as it relates to communication activities. See **Chapter 3: Leveraging** for more information on leveraging tools. See **Chapter 5: Training and Education** for information on curricula.

In this chapter, we categorize products into four types:

- **In-person interactions** involve the transfer of knowledge through direct contact in a personal or group setting. Examples include speeches, presentations, educational events, workshops, home health visits, health and science fairs, town hall meetings, community theater productions, and environmental health outreach at local community markets. Many of these in-person interactions rely on providing print materials (such as fact sheets), presenting audio-visual products (such as a film), or using web-based products (such as showing how to access a list of experts at a nearby university). Additionally, giveaways, such as pencils, key chains, and small calculators, can be provided to reinforce the message. These giveaways usually have a short message, reminder, or contact information printed prominently on them.

- **Print materials** provide written content via pamphlets, brochures, manuals, newsletters, books, magazine articles, handouts, posters, and billboards, among other things.

- **Web-based products** utilize the internet to engage audiences through a variety of technical interfaces, such as email, interactive websites, YouTube videos, interactive discussion boards, chat rooms, podcasts, Facebook, and Twitter.

- **Audio-visual products** present information through films, videos, radio programs, television segments, public service advertisements, and video conferences. These products can include educational videos and public service announcements.

These categories of products can overlap. For example, a fact sheet printed on paper can also be available on a website. The above descriptions are not exhaustive, and the use of innovative products is encouraged. Facebook, Twitter, YouTube[23, 24] and TED[25] presentations are examples of newer methods for conveying information to the general public.

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[23] Mai E. 2007. Exercising is Healthy. Available: *https://www.youtube.com/watch?v=pKcL_LY2cel&feature=related* [accessed 19 January 2021].

[24] Shuey K. 2008. Safe Home Cleaning Products. Available: *https://www.youtube.com/watch?v=yY6lKEYqRsE* [accessed 19 January 2021].

[25] TED is an online resource that posts videos of seminars covering a wide range of topics. For example, see TED. 2010. Majora Carter's Tale of Urban Renewal. Available: *https://www.ted.com/talks/lang/eng/majora_carter_s_tale_of_urban_renewal.html* [accessed 19 January 2021].

Dissemination Strategies

Dissemination strategies refer to the directed and managed diffusion or distribution of information. For our purposes in this Manual, dissemination refers to the process of providing information to raise awareness about environmental health issues, with the goal of reducing adverse environmental health exposures.

Grantees can choose from many different dissemination frameworks. The NIH translational research framework, which defines the progression of science from bench to clinic (T1), clinic to public health (T2), and wide communication (T3), is one model for understanding dissemination strategies.[26] This model, however, tends to focus on translating basic science to clinical practices and pharmaceutical products. NIH's framework also supports the emerging area of dissemination science by hosting an annual Conference on the Science of Dissemination and Implementation, which brings together researchers to share strategies for using dissemination to close the gap between research evidence and clinical and public health practice and policy.[27] A British version of a translational framework focuses on translating basic science to public health policy and practices.[28] This framework aims to improve public health through surveillance and identification of modifiable risk factors and reflects the iterative and bidirectional process through which public health research and public health action influence each other.

These frameworks for translating research are helpful in identifying communication pathways for creating and disseminating products. Examples of these pathways include:

- **Researchers to communities:**[29] By engaging community members or leaders through a community advisory board, the research findings of a study can be translated into messages appropriate for the community of interest.

- **Communities to researchers:** Community members who participate in research can inform investigators about areas of research that will meet community members' needs. They can do this by having open discussions with and briefings for investigators.

- **Communities to decision-makers:** Community members who are engaged in an environmental public health program can learn about research findings and take them on as personal concerns. Such concerns might prompt community members to express their opinions to decision-makers in public forums, which can lead to protective regulation or policy.

- **Communities to schools or public health officials:** Community members engaged in PEPH program activities can facilitate changes that can be implemented in schools or in public health programs and projects.

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[26] Woolf SH. 2008. The meaning of translational research and why it matters. JAMA 299(2): 211-13.

[27] National Institutes of Health (NIH). 2011. 4th Annual NIH Conference on the Science of Dissemination and Implementation.

[28] Ogilvie D, Craig P, Griffin S, Mcintyre S, Wareham NJ. 2009. BMC Public Health 9(116); doi: 10.1186 |1471-2458-9-116.

[29] In this Manual, "communities" are defined broadly to include member organizations, faith-based organizations, members of shared geographic locations, and those affected by a certain environmental hazard or event.
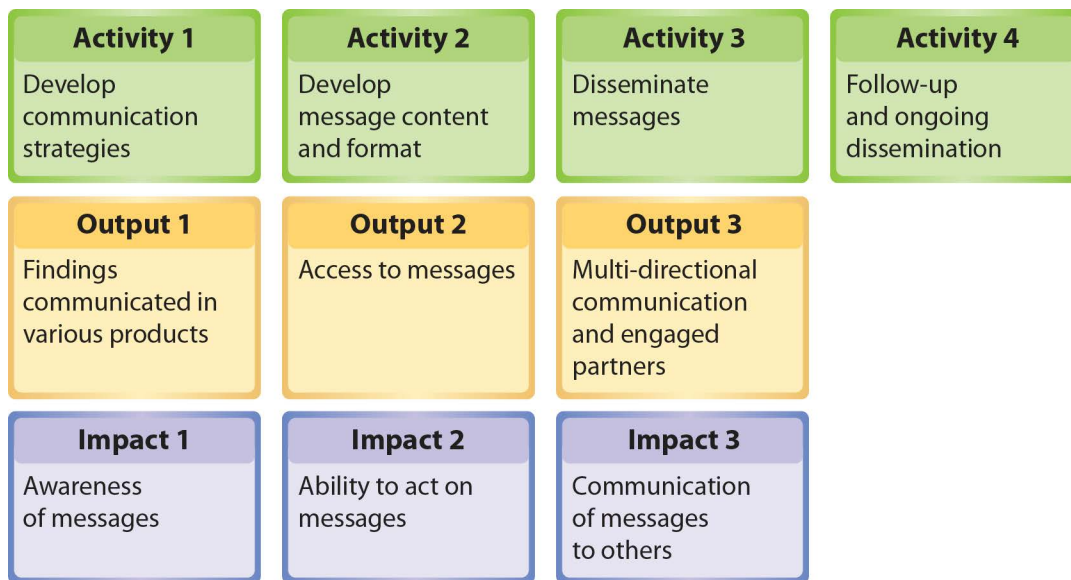
Products and Dissemination Logic Model

This model identifies potential activities, outputs, and impacts of successful product development and dissemination strategies. Grantees should use this chapter to brainstorm other activities, outputs, and impacts that are applicable to their specific projects. This model contains three major components:

- **Activities** are actions that are based on available inputs for dissemination strategies.

- **Outputs** are the direct products of dissemination activities.

- **Impacts** are benefits or changes resulting from the activities and outputs (ultimate or long-term impacts are also examined in Chapter 7: Principles of Evaluation).

We developed the logic models in this guide recognizing that grantees reflect a wide range of experience and capacity. Some grantees have been funded for more than 20 years, while others are just getting started. In general, the logic models show increasing levels of maturity from left to right and from top to bottom. However, a logic model is not necessarily linear; not every PEPH project will begin with "developing communication strategies" and proceed through all components to "communicating messages to others." Additionally, projects might not necessarily adhere to or exhibit all of the elements of the model.

Ideally, anyone working to develop products and disseminate materials will recognize themselves in one or more of the logic model components. The elements of the model are numbered in Figure 4.1 to provide reference for discussion in the text of this chapter.
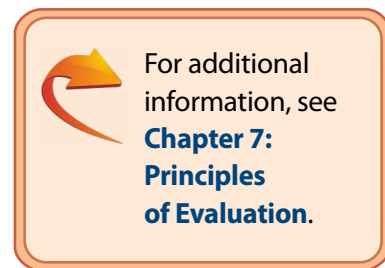
Figure 4.1 Products and Dissemination Logic Model With Examples of Activities, Outputs, and Impacts

Activity 1	Activity 2	Activity 3	Activity 4
Develop communication strategies	Develop message content and format	Disseminate messages	Follow-up and ongoing dissemination

Output 1	Output 2	Output 3	
Findings communicated in various products	Access to messages	Multi-directional communication and engaged partners	

Impact 1	Impact 2	Impact 3	
Awareness of messages	Ability to act on messages	Communication of messages to others	

Sources of Data

Grantees may find the following sources of data to be helpful in tracking achievements related to products and dissemination:

- Activity logs
- Contact logs
- Participant lists
- Feedback forms
- Publication and material development lists
- Meeting agendas
- Telephone logs
- Communication strategies and plans

- Budgets
- Group discussions
- Surveys
- Interviews
- Meeting notes
- Email exchanges
- Internet web logs

> For additional information, see **Chapter 7: Principles of Evaluation**.

Activities

Activities, as defined in the framework of the products and dissemination logic model, are actions that use available inputs to create and disseminate information through a variety of media. The model highlights four broad types of activities:

Activity 1: Develop communication strategies

Activity 2: Develop message content and format

Activity 3: Disseminate messages

Activity 4: Follow-up and ongoing dissemination

Activity 1: Develop communication strategies

Activity 1	**Activity 2**	**Activity 3**	**Activity 4**
Develop communication strategies	Develop message content and format	Disseminate messages	Follow-up and ongoing dissemination
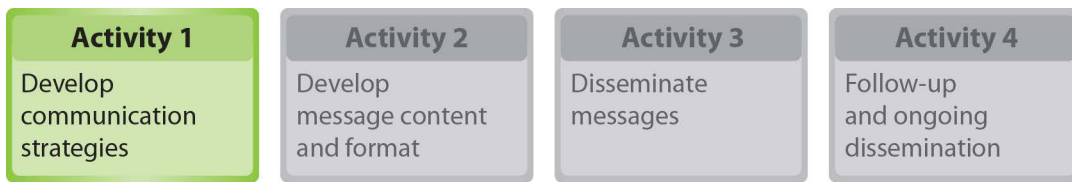
A communication strategy provides a framework for transferring information between partners and broader audiences. It is a tool for enhancing not only environmental health literacy and knowledge, but also communication and trust.[30]

Developing a communication strategy involves defining goals of communication, setting objectives, characterizing the target audience, and identifying its communication habits. The target audiences for communication in PEPH projects vary greatly in their scientific literacy, language, general cultural norms, and other characteristics. For example, health professionals and community organization members can both be target audiences of a PEPH project communication plan, but the mechanisms for communicating with each can differ because of diversity in scientific literacy and other characteristics.

Communication strategies ideally engage the audience in communication planning activities. Active target audience input and participation is an important tool for identifying communication needs. Formative research—research that helps programs understand the interests, attributes, and needs of different populations and persons in the community—can be conducted in ways that assist in tailoring messages to communities of interest. Communication strategies typically include a plan for developing content that is directed toward a target audience and a plan for dissemination.
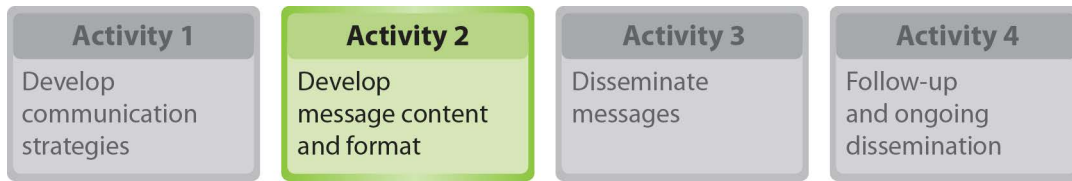
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[30] For additional resources regarding health communication, see Thompson TL. 2003. Handbook of Health Communication. Mahwah, NJ: Lawrence Erlbaum Associates, Inc.

Feedback from the audience can be collected using a variety of tools. For example, partners can get information through focus groups, through informal and formal discussions with community members and leaders, and from organizations and institutions (such as schools and churches) that often interact and disseminate materials within the community, as just a few examples. The effectiveness of a communication strategy can be measured by consultation among partners in advisory board meetings, by surveys of the target audience, and by other methods as well. Partners can evaluate these methods by testing the absorption, effectiveness, or impact of different forms of communication. Another way to measure the effectiveness of a communication strategy is to test certain forms of communication on a small sample of the target audience, randomly selected (if possible), and measure retention of message content.

Example Metrics for Activity 1: Develop communication strategies

- Description of goals and objectives of communication strategy.

- Description of target audience for communication.

- Description of communication channels most effective for audience and message.

- Number and description of target audience members who were involved in developing communication strategies.

- Description of methods of communication most frequently used by members of the intended audiences.

- Description of methods used to obtain feedback from the target audience on the communication strategy.

Activity 2: Develop message content and format

Activity 1	Activity 2	Activity 3	Activity 4
Develop communication strategies	Develop message content and format	Disseminate messages	Follow-up and ongoing dissemination

Successful dissemination strategies focus on developing appropriate message content, as well as on the design and format of the product. Using both formal and informal inquiries, grantees can work with members of the target audience to test the messages and ensure that the content is appropriate and meaningful for the audience. These inquiries allow partners to:

- Get to know the target audience to identify the environmental public health concerns that it cares about. Grantees can engage target audiences through meetings, surveys, focus groups, and other interactive strategies to determine the most effective communication tools, media, and channels for a particular audience.

- Work together to present findings in a way the target audience can understand. Partners can create messages based on what they know about the target audiences' scientific knowledge, skill sets, literacy, and interests. Grantees may want to consider developing different materials for different audiences. For example, a brochure designed to raise awareness among community members about environmental public health issues would be different from material developed to persuade policymakers to address the same issues.

- Determine the media formats the audience finds most comfortable and the format that best communicates the message.

- Test materials on members of the target audience. Encourage testers to provide constructive comment about content and format of messages.

- Revise products based on comments from test audience.

Example Metrics for Activity 2: Develop message content and format

- Number and description of messages developed about environmental health risks.
- Description of involvement of target audience in developing theme and content of message.
- Number of languages in which materials are available.
- Description of steps taken to address cultural context of target audience.
- Description of adaptations made to create products appropriate to different audiences.
- Number and description of print materials developed.
- Number and description of web-based products developed.
- Number and description of audio-visual products developed.
- Number and description of in-person products developed.
- Number and description of other types of products developed.
- Description of testing of message with target audience communication strategy.

Metrics in Action 4.1: The **Dartmouth Toxic Metals Superfund Research Program Research Translation Core (RTC)** works to communicate the Superfund Research Program's research results in user-friendly formats that will help federal and state agencies, nonprofits, and grassroots organizations make informed decisions on issues that affect the health of their communities.
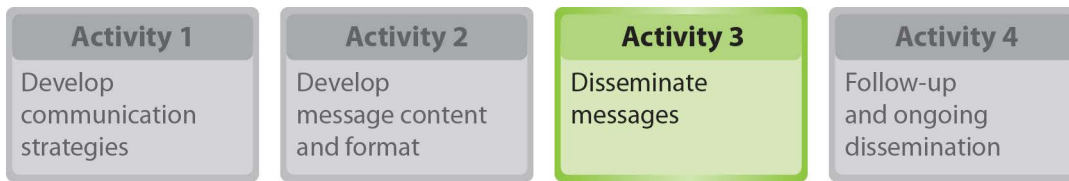
The RTC decided that a video would be an effective way to clearly communicate technical scientific concepts and environmental public health warnings, as well as preventive actions that could be taken to mitigate arsenic contamination. The RTC created a 10-minute video, entitled "In Small Doses: Arsenic," to help private well owners and the general public understand risky behaviors. It also informed scientific colleagues, interest groups, and the public about what actions they could take to benefit public health. The video explains how naturally occurring arsenic moves into groundwater, how it is detected, what can be done to remove it, and the current science surrounding the question of how much arsenic is too much. The RTC's main purpose in developing the video was to ensure that the general population could understand the message. The group also provided the video to federal and state environmental agencies, scientific colleagues, and interest groups.

Metrics for developing message content and format:

- Description of involvement of target audience in developing theme and content of message: *The video was developed with input from households that had conducted arsenic remediation on their personal well water systems. The video was also tested and revised based on input from a target audience test group.*

- Number and description of audio-visual products developed: *One 10-minute video, entitled "In Small Doses: Arsenic."*

For more information about the Dartmouth Toxic Metals Superfund Research Program, visit: https://www.dartmouth.edu/~toxmetal [accessed 19 January 2021].

Activity 3: Disseminate messages

Activity 1	Activity 2	Activity 3	Activity 4
Develop communication strategies	Develop message content and format	Disseminate messages	Follow-up and ongoing dissemination

The goal of dissemination is to ensure that the messages and products reach the target audience so that recipients can fit new information into their current understandings and experiences.[31] Active dissemination of environmental public health messages will likely require that grantees work with other partners, media contacts, and community members to ensure that information is passed on to those who need it. Distribution of these messages may require the use of media such as radio, television, and social networking tools, as well as more individualized distribution channels such as classrooms, community events, and similar opportunities where members of the partnership have an opportunity to interact directly with the target audience.

Four main types of dissemination products can be developed: in-person, print, web-based, and audio-visual. Personal contact can involve meeting with people and providing information through the other three types of products (paper, audio-visual, or web-based materials). Personal contact can also include telling audiences how and where to access additional materials. Print materials can be distributed at any location where members of the target audience are present and likely to respond to handouts. For example, public venues such as community centers and libraries could be effective places to distribute project information, as well as in seminars, courses, or schools. Internet-based materials can be used to reach people in their own settings, where they are most comfortable reading and digesting information. Audio-visual materials can be distributed in a downloadable format on a website or showcased on a project's website.

PRODUCTS AND DISSEMINATION

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[31] Research Utilization Support and Help (RUSH) Project. 2001. Developing an Effective Dissemination Plan. Available: *https://www.researchutilization.org/matrix/resources/dedp* [accessed 19 January 2021].

Example Metrics for Activity 3: Disseminate messages

- Description of dissemination plans.
- Number of channels or strategies used to disseminate products and messages.
- Description of plans for disseminating information during events, gatherings, or new events created to increase participation of audience.
- Number of events attended to disseminate products or materials.
- Budget allocated for dissemination activities.
- Number of products or materials distributed.
- Number of partners, volunteers, and community members disseminating materials (for example, number of individuals or hours spent disseminating).
- Number of target audience members who understand the message.
- Number of target audience members who have incorporated the message into their own beliefs, attitudes, and behaviors.
- Number of audience members who are able to spread the message to others.

Metrics in Action 4.2: The **Southern California Environmental Health Sciences Center Community Outreach and Education Program (COEP)** wanted to develop a high-impact way to communicate the findings of its research to key stakeholders. They secured funding from the California Air Resources Board to create a documentary video, "A Breath of Air: What Pollution is Doing to Our Children." The 28-minute video features a scientist, key government regulators, the executive director of the Center for Community Action and Environmental Justice, and several families affected by air pollution. The Center eliminated physical and financial barriers to access by making the video available in multiple formats for free. COEP also lowered the conceptual barriers to access by making the material available in multiple languages and presenting the technical information at different levels of detail.

The Center disseminated the video to more than 500 organizations, resulting in thousands of viewings. Organizations that have ordered the video include 10 California chapters of the Lung Association, three nursing schools, seven health departments, and many others. The video is offered for free in Spanish and English on DVD or VHS cassette, and it is available for download from the California Air Resources Board website.

Metrics for disseminating messages:

- Budget allocated for dissemination activities: *XX% of the budget was allocated for dissemination activities.*
- Number of products or materials distributed: *One video was distributed to more than 500 organizations, including ten California chapters of the Lung Association, three nursing schools, seven health departments and many others.*

Activity 4: Follow-up and ongoing dissemination

Activity 1	Activity 2	Activity 3	**Activity 4**
Develop communication strategies	Develop message content and format	Disseminate messages	Follow-up and ongoing dissemination

Many projects strive for continual improvement of their products and dissemination strategies in order to remain current and adapt to changing needs.

Some approaches for updating and following up on the creation and dissemination of products and messages:

- Communicate new research findings on a regular basis (include dates on materials and update regularly).
- Continue to involve the target audience in translation and dissemination activities.
- Engage groups that will assist in the dissemination of materials and expand to new target audiences.
- Share resources with other programs.
- Provide additional training, education, and community-building exercises.
- Maintain a website and update it on a regular basis.
- Provide handouts that participants can take home.
- Test and seek feedback on products and messages on an ongoing basis.

Example Metrics for Activity 4: Follow-up and ongoing dissemination

- Number and description of regularly scheduled meetings.
- Monthly newsletters or web-based outreach to inform target audiences of ongoing events.
- Weekly radio or television public service announcements.
- Number and description of forums created to increase and maintain participation.
- Survey results from participants about messages and dissemination techniques, including reports, fact sheets or summaries of survey findings.
- Description of improvements made to content, format, and strategies.
- Description of methods used to engage target audience and other partners in improving the communication strategy, content, and format.
- Description of ways survey results were used to inform changes to dissemination strategies.

Outputs

One of the primary goals of dissemination activities is to create outputs in the form of products and messages. These outputs are the results of the efforts of the PEPH grantees to translate research findings into public health interventions. In this section, we discuss the three outputs below.

> Output 1: Findings communicated in various products (in-person, print, web, and audio-visual)
>
> Output 2: Access to environmental health messages and information
>
> Output 3: Multi-directional communication and engaged partners

Output 1: Findings communicated in various products

Output 1	**Output 2**	**Output 3**
Findings communicated in various products	Access to messages	Multi-directional communication and engaged partners
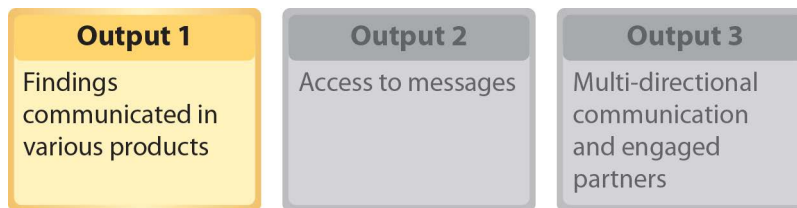
Almost all PEPH grantees will develop and disseminate products and messages at some point during a project. Thoughtful development of messages and products leads to an increase in knowledge, capacity, and engagement of a target audience. Concrete products are often the most straightforward outputs of activities. The products themselves and information about them can be distributed and disseminated through a wide range of mechanisms and channels. These include brochures, leaflets, databases, internet sites, mailing lists, and much more.

Some examples of how to measure findings communicated in various products include:

- **In-person interactions:**
  - Recording interactions with groups and individuals at events (e.g., fairs and community forums).
  - Recording meetings and taking notes during community forums and meetings.
  - Tracking number of giveaways and estimating number of contacts made during events and engagement activities.
- **Print materials:**
  - Counting the number of print materials created.
  - Keeping a record of the number of materials disseminated and locations of dissemination.
  - Recording additional requests for materials and number distributed.
- **Web-based products, including social media:**
  - Installing a counter on website to track number of visitors and geographic distribution.
  - Creating a survey for site visitors.

- **Web-based products, including social media:** *(continued)*

  – Tracking and counting the number of links from other sites to the PEPH project or program website.

  – Keeping web logs for site activities and counting number of materials downloaded from site (such as fact sheets and curricula).

- **Audiovisual products:**

  – Tracking community-wide showings of videos (documentaries, short films, etc.).

  – Describing partnerships with local television stations that can air informational programming and public service announcements (PSAs).

  – Tracking ratings and viewership of broadcast materials.

Example Metrics for Output 1: Findings communicated in various products

In-person interactions

- Number of and description of events attended such as health fairs, community forums, workshops, home health visits, meetings, focus groups and one-on-one conversations.

- Description of national conferences and town hall meetings in which partners participated and communication products were disseminated.

- Number of partner participants and attendees at these meeting and forums.

- Number of questions asked during and after the meeting.

- Number and description of events held with government agencies, advocacy groups, and non-government officials.

- Number of materials picked up at the dissemination events.

- Number of partners organizing events to demonstrate involvement in the partnership.

- Number of contact hours of partners involved in research.

- Effectiveness of in-person meetings, established by feedback from participants.

Print materials

- Number of products and materials distributed.

- Number of requests made for the materials.

- Description or lists of places distributed.

- Description or lists of audiences receiving materials.

- Description of the target audience that received the materials and an indication of whether the audience reviewed the materials or forwarded them to other recipients.

- Co-authorship on materials (with a mix of partners as appropriate).

- Involvement of partners and target audiences in research translation for content.

- Effectiveness of products, established by feedback from product recipients and users.

Example Metrics for Output 1: Findings communicated in various products *(continued)*

Web-based products
- Number of hits to the website by originating sources of the hit (.edu, .gov, etc.).
- Number of hits to website by geographic areas.
- Number of third party links to the website.
- Number of downloads.
- Average and range of time users spend at website.
- Description or lists of source sites that are driving users to the website.
- Amount of use of interactive websites (such as Web 2.0).
- Number and description of comments collected from web pages and blogs.
- Number of contributions collected (such as blogs, wikis, forums, etc.).
- Number of unique visitors.
- Page views per visitor (e.g., total time spent per user, frequency of visits, depth of visits).
- Description of activity on website discussion board.
- Effectiveness of products, established by feedback from product recipients and users.

Social media
- Number and demographics of members or followers.
- Number and description of messages sent.
- Number of people who open a message.
- Number of people who click on certain links within a message.
- Number of people who forward the message on to others; size of secondary audience.

Audio-visual products
- Number of products disseminated.
- Description of how product is tailored to audience.
- Description of type (such as podcast, YouTube video, film).
- Number of viewers.
- Pick up of the product by other media such as newspapers and TV.
- Number of discussions in newspapers, news television, YouTube.
- Number of discussions in social media.
- Traffic to and usage of products posted online or provided by other means.
- Interactions (such as leaving comments, participating in discussion forums, leaving reviews and ratings, etc.).
- Effectiveness of audio-visual products, established using feedback from product recipients and users.

Metrics in Action 4.3: The **University of California, San Diego's (UCSD) Superfund Research Program (SRP)** created a 28-minute UCSD-TV video documentary ("Los Laureles Canyon: Research in Action") to explore complex environmental health issues, build cross-border partnerships, reach mass audiences, and bring about change. The video has been viewed more than 100,000 times. This documentary film constitutes a useful model for reaching lay audiences and has been featured on a wide range of media outlets, including Cable TV, UCSD TV, the Research Channel – National Science Foundation Emerging Frontiers Program, the 2009 American Association for the Advancement of Science Annual Meeting, the Global Action Research Center Sustainability Solutions Database, and most recently at the opening session of the 2010 American Public Health Association Film and Media Festival.

The goal of the work presented in this documentary is to enable community leaders to identify priority environmental health issues and provide decision-makers (including those at U.S. EPA and Mexican Government Agencies) with relevant information to eliminate or reduce exposure of vulnerable border communities to Superfund chemicals and other environmental hazards. The documentary features UCSD SRP's efforts to help address the flow of Superfund chemicals and other hazardous wastes along and across the U.S.-Mexico border. It highlights how SRP integrates participatory watershed-based planning with environmental health science (including the development and application of novel SRP biomolecular technologies) and climate change science.

Metrics for findings communicated in various products:

- Number of products disseminated: *One documentary video was created.*

- Number of viewers: *The video has been viewed more than 100,000 times through a wide range of media outlets.*

Metrics in Action 4.4: The **Bay Area Breast Cancer and the Environment Research Center/ Zero Breast Cancer** has adopted new technologies to communicate with its partners. The Center uses social media tools such as Facebook and Twitter to disseminate research findings, prevention messages and updates on Center activities. The use of these innovative channels enables the Center to stay in touch with partners and develop a reputation as a reliable source of breast cancer information.
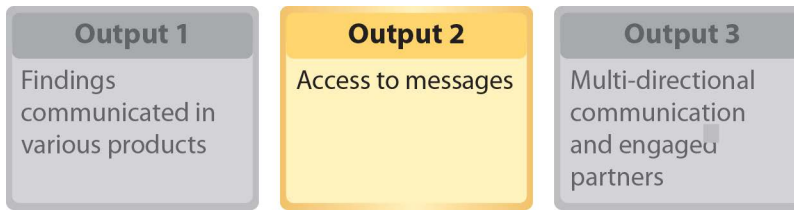
With a goal of "translating and communicating research findings to the public, policy makers and other audiences most likely to benefit from the findings," the Center developed a strategic plan that incorporated traditional communication channels in addition to web-based and social media outlets. This multi-pronged approach provides the Center with a way to reach many different audiences by using multiple channels to disseminate the same message. The Center committed to building and maintaining the infrastructure necessary to monitor and evaluate its dissemination activities. This included a subscription to Constant Contact (a direct email marketing package) and staff time to maintain Facebook and Twitter accounts.

As part of its dissemination plan, the Center monitors the number of messages sent out via each communication channel, the number of viewers and the topic or content of the message delivered. Unlike traditional media such as television, radio and newspapers, social media allow the Center to track the number of people who open a message, the number of people who click on certain links within a message and the number of people who forward the message on to others. This information is valuable in understanding which messages resonate with the target audience. The information also helps the Center shape future messages.

Metrics for findings communicated in various products:

- Number and demographics of members or followers: *The Center has more than 1,000 followers on Twitter and 864 Facebook "friends." Followers are 70% female, and more than half are 40 or older.*

- Number and description of messages sent: *The center averages at least one tweet and one Facebook message per day. The message focuses on prevention activities followers can do, such as reminders to eat fruits and vegetables daily.*

Output 2: Access to messages

Output 1	**Output 2**	Output 3
Findings communicated in various products	Access to messages	Multi-directional communication and engaged partners

Access to translated materials is an intangible output of dissemination activities. Through the use of a solid communication strategy and the development of messages and products in an appropriate format, partners can maximize accessibility for a target audience. Partners can also facilitate information transfer to new groups through the connections and social networks of the target audience.

In this section, we distinguish between two categories of access: physical and conceptual. Physical access means that the intended audience can see, listen to, or otherwise directly interact with the products. To assess this, project partners might ask: Are the products physically available to the audience? Are they distributed in areas inhabited by the target audience? If materials are available on the web, does the audience have access to the internet? Partners can increase physical access by using multiple channels or strategies for communicating PEPH messages. Disseminating and broadcasting messages at various times of the day or week can also be effective. In addition, networking with target audiences and attending other events can provide more opportunities for ensuring that products and messages make it into the hands of the target audience.

Conceptual access refers to how well the audience understands the intended message. To ensure that the target audience has conceptual access to products and messages, partners might ask: Are the products written in ways to be easily understood by the target audience? Do the messages make sense in the cultural context of the audience? Are technical concepts, graphs, and jargon explained clearly? Partners can increase conceptual access by monitoring the use of materials and feedback and by using multiple communication strategies (e.g., pairing print materials with in-person interactions). Consulting with representatives of the target audience to identify emerging language or behavioral trends can also be very helpful.

Grantees can optimize both physical and conceptual access by using different modes of communication (e.g., both individualized and group-focused) and different mechanisms for dissemination (e.g., print or web-based).

Example Metrics for Output 2: Access to messages

Physical access

- Attendance at events.

- Number and description of written materials distributed.

- Number of views for videos or other media.

- Number of website hits.

- Number of home environmental health or promotora (community health worker) visits.

- Number of medical or household personal exposure interventions.

- Estimates of television and radio spot coverage based on time covered, number of listeners, or television coverage viewership.

- Number of target audience members who report having access to project-related information, products, or messages.

Conceptual access

- Number of languages in which the products are available, especially the language of the target audience.

- Description of efforts to explain scientific concepts in lay terms, as well as in terms that are meaningful for the target audience (e.g., describing specific respiratory symptoms might be more effective than discussing potential respiratory effects of environmental hazards).

- Description of how products and messages are consistent with cultural understandings of the target audience.

- Reports of understanding from target audience.

Metrics in Action 4.5: Reducing exposure to developmental toxicants among Latino children is the mission of the **Outreach Core (OC)** and **Research Translation Core (RTC)** within the **Duke University Superfund Research Center** The program partners include the North Carolina Division of Public Health's Nutrition Services Branch and the North Carolina Healthy Start Foundation. The OC and RTC conduct environmental health outreach and education directed at low income and minority women and their children, enhance the capacity of disadvantaged communities to understand threats posed by environmental contaminants, and provide a bridge between campus research, communities, and policymakers.

The partners develop materials that address the specific needs of different audiences, and they use a variety of dissemination strategies to increase the audiences' access to information. To address conceptual access, the group developed novellas that provided information about fish consumption by pregnant and early postpartum Latina women. The OC and RTC developed the outreach materials based on input from Latina women, who reviewed the materials and provided feedback. The OC and RTC incorporated the new informational products into several subsequent projects. They also disseminated the materials through the Center's local and national networks, as well as through a partner's public access website.

Metrics for access to messages:

- Number and description of materials distributed: *The OC and RTC created a novella targeting Latina women. The novella provided information about fish consumption for pregnant and early postpartum women.*

- Number of languages in which the products are available, especially the language of the target audience: *The novella is available in Spanish and English.*

For more information about the Duke Superfund Research Program, visit:
https://sites.nicholas.duke.edu/superfund [accessed 19 January 2021].

Output 3: Multi-directional communication and engaged partners

Output 1	Output 2	Output 3
Findings communicated in various products	Access to messages	Multi-directional communication and engaged partners
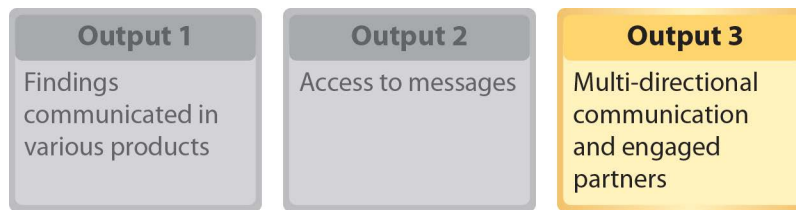
Open communication between partners and participants in PEPH projects can be an important component of a communication strategy. Examples of multi-directional communication include developing opportunities for interactive dialog among project members and intended audiences; developing mechanisms for raising awareness of environmental health issues while enhancing communication; and establishing long-term trusting relationships with partners, key members of audiences, key informants, etc.

For more information, see **Chapter 2: Partnerships**.

Multi-directional communication between partners can provide useful feedback on products and messages including the quality, focus, and relevance of the products. More engagement of partners and participants often leads to clearer messages, better products and materials, and better dissemination.

Grantees can assess multi-directional communication and engagement by examining the distribution of resources, decision-making processes, contributions to message development and dissemination strategies, and feelings of ownership.

Opportunities for multi-directional communication include:

- Radio shows
- Website discussion boards or chat rooms with researchers, doctors, or other experts
- Lunchtime forums
- Group conversations
- Conferences, workshops
- Promotora visits
- Health fair booths
- Trainings
- Science day town hall meetings
- Focus groups

**Example Metrics for Output 3: Multi-directional communication
and engaged partners**

Participation

- Reports of regularly scheduled meetings and interactions.

- Number of partners in attendance at formal and informal interactions.

- Number of members participating in community forums, website discussion groups, radio shows,
  or other interactive media.

- Types of partners participating in meetings.

- Diversity of partners by ethnic group, cultural group, and geographic location.

Quality and equality of interactions

- Description of opportunities for partners to be heard.

- Description of exchanges that occur.

- Anecdotal evidence of ease of use and implementation of message.

- Number of new or revised products and dissemination techniques that were developed based
  on feedback from partners and the community.

Retention

- Retention rates of volunteers and partners who regularly disseminate material.

- Number of participants from the target audience or community at regularly scheduled
  meetings over time.

Consistency

- Frequency of reviews for consistency in messages and products.

- Description of procedures or actions for evaluating consistency in messages and products.

Metrics in Action 4.6: The **Aberdeen Area Tribal Chairman's Health Board (AATCHB)** and The **University of Iowa Environmental Health Sciences Research Center (EHSRC) Community Outreach and Engagement Core** jointly hosted the Asthma Education Conference for Tribal Health Officers Serving the Northern Plains Area in South Dakota in October 2006. The goal of the meeting was to advance the knowledge of asthma among tribal health professionals working within the Aberdeen Area (North Dakota, South Dakota, Nebraska, and Iowa) by providing an opportunity for communication among all partners. The tribal health professionals were able to gain a better understanding of asthma and its environmental triggers in their communities and use this knowledge to deliver better medical care and improve health outcomes. At the same time, tribal members were able to provide project staff with insight into the problem of asthma in the Native American community and discuss cultural issues related to potential treatments. The conference also provided an opportunity to foster new and ongoing collaborations between tribal health leaders, Native American health organizations, area universities, and government entities. Collaborations and meetings such as this one allow communities to voice their needs to partners and gain access to environmental public health information, while they also provide an opportunity for project staff to hear from partners.

Metrics for multi-directional communication and engaged partners:

- Description of opportunities for partners to be heard: *The Core hosted a conference that was structured so that all participants had a chance to lead, moderate, and participate in sessions.*

- Diversity of partners by ethnic group, cultural group, and geographic location: *Partners from all over the state participated in the conference, including tribal health leaders, Native American health organizations, area universities, and government entities.*

For more information about the University of Iowa EHSRC,
visit: https://ehsrc.public-health.uiowa.edu/ [accessed 19 January 2021].

Impacts

Impacts are benefits or changes resulting from the activities and outputs. The products and dissemination logic model example in this Manual identifies three examples of impacts that can result from effective products and dissemination. Examples of impacts for discussion of products and dissemination are:

> Impact 1: Awareness of messages
>
> Impact 2: Ability to act on messages
>
> Impact 3: Communication of messages to others

Impacts are more difficult to measure than activities and outputs, in part, because it often takes several years for substantive changes to occur. When thinking about the impacts a project might be able to achieve and how to measure those impacts, it can be helpful to think in terms of short-term and long-term impacts. Short-term impacts are typically those changes that would be expected to see in the first few years of a project. Long-term impacts might not be seen for five or more years. It is helpful for grantees to identify intended impacts so that they can identify measures that will help document their progress in achieving impacts.

Grantees also may be hesitant to claim credit for impacts because other organizations or other contextual factors may have contributed to the changes. While grantees may not be able to claim sole credit for these impacts, it is important to be able to track these broader changes and to document the contributions made by the project to achieving these impacts.
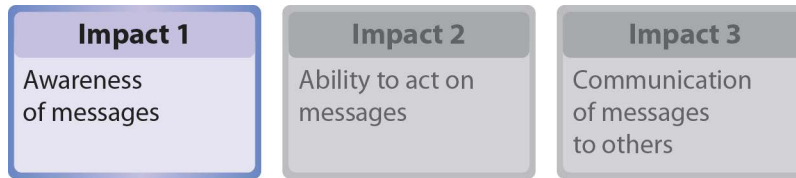
> For additional information on long-term impacts, see **Chapter 7: Principles of Evaluation**.

Although there are challenges associated with measuring impacts, tracking progress toward these goals helps grantees stay on track, demonstrate success, and identify areas for improvement. Most importantly, the ultimate goal of products and dissemination is to produce outcomes and impacts that lead to improvements in health through a reduction in environmental health hazards.[32]

In measuring impacts of dissemination activities, it may be helpful to consider the impacts in three stages: awareness, action, and advocacy. Individuals who are aware of the issue understand your message and are able to contemplate how the environmental public health issue might affect them or their community. Individuals who are taking action are in the process of changing their behavior based on your message. Finally, individuals who are advocating have changed their behavior and are sharing your environmental public health message with others.

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[32] See also, Silka L. 2000. Evaluation as a strategy for documenting the strengths of community-based participatory research in: Successful Models of Community-Based Participatory Research, 29-31 March 2000: Final Report, Washington, DC. 49-54. (O'Fallon LR, Tyson FL, Dearry A, eds). Available: _https://www.hud.gov/sites/documents/DOC_12485.PDF_ [accessed 19 January 2021].

Impact 1: Awareness of messages

Impact 1	**Impact 2**	**Impact 3**
Awareness of messages	Ability to act on messages	Communication of messages to others

Increased awareness of environmental health messages can lead to a better understanding of environmental exposures and their sources. Audiences gain awareness by listening to, understanding, and using the information contained in environmental health messages. In other words, awareness is fully absorbing the information to the point of being able to use it and explain it to others.

With effective awareness, partners, participants, communities, and decision-makers can better identify and contemplate environmental health concerns related to the community. They are also better able to understand the relevance of scientific findings and create engaged communities within target audiences around issues relevant to them.

Awareness of environmental health messages can occur through:

• Continuous engagement of partners in dissemination activities.

• Consistency of messages and relevance of content to target audiences.

• Progression of knowledge and capacity building through messages and project activities, such as increased complexity of materials and literacy level to reflect knowledge gained.

• Participation of new partners and audiences.

Some strategies for measuring awareness include:

• Using quizzes and surveys in formal and informal settings.

• Gathering letters of support, testimonials, and other formal evidence of support and recognition of the PEPH project and partner work.

• Tracking increases in media coverage or interest in a PEPH topic (for example, the local news does an exposé, or a local television station shows a documentary).

Example Metrics for Impact 1: Awareness of messages

• Results of post-intervention survey to test recall of messages.

• Description of audience understanding.

• Number of calls or requests for environmental health information from community over time.

• Number of articles or other forms of media coverage that address the environmental public health message.

• Description of coverage in media of the environmental public health message.

• Trends of attendance and contributions at meetings over time (for example, community members with knowledge about the public health issue may be more likely to speak up at meetings and voice their concerns).

• Individuals able to use language and ideas learned from products and dissemination.

Metrics in Action 4.7: The **Michigan State University Breast Cancer and Environment Research Center (MSU BCERC)** includes community advocates and faculty members from the Department of Communication. The Community Outreach and Translation Core of the BCERC focuses on disseminating research from the BCERC research core, promoting the BCERC website, and encouraging behavioral change. In order to reach out to target audiences to improve the efficacy of future educational messages about breast cancer, MSU BCERC researchers investigated awareness and uptake of environmental public health messages. They conducted a message recall survey of more than 350 women about topics and sources of memorable breast cancer messages and used the findings to target educational outreach activities to suit the needs of participants. Results from messaging research are available online, were presented at the research organization's yearly symposium, and are released in periodic press reports.

Metrics for awareness of messages:

• Results of post-intervention recall of messages: *Findings indicated that most women (60%) recalled a memorable message, described it, identified its source, and noted whether it had resulted in prevention or detection behaviors.*

• Description of audience understanding: *Women were able to describe the message and explain how they could apply it in their own lives.*

Impact 2: Ability to act on messages

Impact 1	**Impact 2**	Impact 3
Awareness of messages	Ability to act on messages	Communication of messages to others
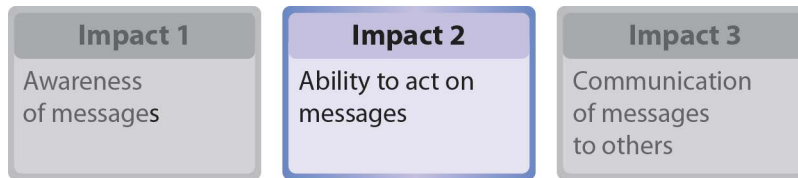
Individuals who are aware of messages are more likely to take action based on them. Effective information and messages from projects can target an audience in a personal and individualized way. These messages often suggest ways in which the target audience can take action to mitigate environmental health hazards. These informed decisions can eventually improve health.

Some strategies to measure the action taken by the target audience include collecting and analyzing:

- Pre- and post-test data on behavior change.

- Anecdotal evidence of action in various settings such as home, school, and workplace.

- Observations of action taken by the target audience.

While this section focuses on individual-level awareness and action, another dissemination strategy is to provide information to policymakers in an effort to inform environmental public health policies and regulations.

Example Metrics for Impact 2: Ability to act on messages

- Descriptions of changes in action, including quantitative results from assessments of behavior change.

- Anecdotal evidence of informed decision-making.

  – Description of testimonials, articles, etc.

  – Number of calls from community over time.

- Description of decisions made by trainees, students, and participants because of increased awareness or education from program.

- Documentation of published changes in protocols, safety regulations, etc.

- Increased capacity of target audience to address environmental health issues.

  – Number of target audience members involved in PEPH projects.

  – Number of target audience members involved in PEPH leadership activities.

  – Number of new PEPH activities initiated.

  – Description of relationships developed between target audience members and health professionals and decision-makers.

- Number and description of new programs to encourage identification and reporting of environmental or safety hazards.

- Number and description of new research projects, support groups, or enforcement committees established.

- Participation

  – Number of individuals and partners taking action to change workplace, school, or community processes.

  – Number of situations where individuals have taken action, such as in a school, community, or legislative process.
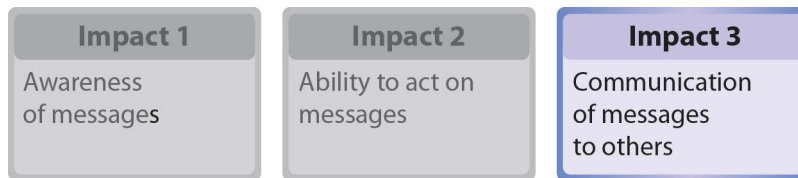
Metrics in Action 4.8: Alaska Community Action on Toxics (ACAT) was established in 1997 to advocate for environmental and community health by limiting the release of contaminants and mitigating the human health effects of toxins in the natural environment. NIEHS grants fund ACAT's community-based participatory research project and the annual Field Institute to provide participants with the tools necessary to conduct their own community-based environmental sampling programs to assess contaminants from local and global sources. Additionally, ACAT, in collaboration with the State University of New York School of Public Health and Norton Sound Health Corporation, has begun a pilot study to help residents design a methodology for conducting research on contaminants so they can be fully engaged in future human health and contaminants studies planned for the region.

After working with community members for more than 10 years, ACAT has seen how communities can affect environmental public health change. After participating in ACAT activities, the indigenous Alaskan community decided in 2009 to reject a proposal for a hazardous waste facility on the island's Northeast Cape. To facilitate support for additional projects, ACAT documented how target audience members became involved as partners to initiate regulatory changes. Based on its successes, ACAT is sharing with other communities those strategies that proved effective in convincing the government to clean up former defense sites in the region.

Metrics for ability to act on messages:
- Anecdotal evidence of informed decision-making: *The indigenous Alaskan communities' decision to reject the 2009 proposal for a hazardous waste facility in their community was based on their knowledge of environmental public health hazards, some of which was gained through interactions with ACAT.*

- Increased capacity of target audience to address environmental health issues: *Since 1997, XXX Alaska Natives have participated in ACAT activities and XXX have actively participated in activities designed to protect their community from environmental public health hazards. For more information about ACAT, visit:* https://www.akaction.org.

Impact 3: Communication of messages to others

Impact 1	Impact 2	Impact 3
Awareness of messages	Ability to act on messages	Communication of messages to others

When a target audience has absorbed a message and altered its actions to reflect the knowledge of the environmental health issue, it may also begin to share that information with others. Some ways in which the target audience may share the message are:

- Word of mouth, such as when partners and participants relay messages learned directly to others.

- Directing others to websites, radio shows, television shows, or other forms of multimedia.

- Distributing materials/messages directly to others.

Some examples of how to measure sharing of messages include:

- Conducting surveys.

- Recording comments from trainers and educators.

- Recording anecdotes from participants or "third parties" who are recipients of secondary information.

- Conducting website user surveys; for example, asking users who access site or download materials how they heard about the materials or website.

- Reviewing media and other groups' literature.

- Talking to attendees (formally or informally) to see how they plan to use the information they have learned.

> ## Example Metrics for Impact 3: Communication of messages to others
>
> - Description of activities conducted to provide partners with information necessary to advocate.
>
> - Number of partners who understand and can share factual information about environmental health hazards.
>
> - Number of partners who actively share information about environmental public health issues.

Metrics in Action 4.9: NIEHS and the **University of Cincinnati (UC) Center for Environmental Genetics** sponsored a community forum to build momentum for community action against environmental injustice. The Center assists scientists working in environmental health sciences and improves understanding of the relationships between environmental exposures and human disease. It conducted the meeting in partnership with community organizations to give the Cincinnati community the opportunity to hear about research in this area and to give their scientists an opportunity to hear about the concerns of community members. Experts from UC helped residents better understand the exposures they faced each day and offered practical ideas about how individuals can reduce their environmental health risks.

Then NIEHS Acting Director Samuel Wilson, M.D., speaks at the University of Cincinnati Community Forum, September 2008.

The community forum "Your Home, Your Health, Your Voice" focused on empowering individuals dealing with environmental exposures. The forum encouraged attendees to voice their opinions and concerns, as well as relay the vital information presented in the forum to loved ones and at-risk members in the community through secondary information transfer. The community forum explicitly encouraged secondary information transfer as a vehicle to promote healthy decision-making in the homes and within the families of participants.

Metrics for communication of messages to others:

- Description of activities conducted to provide partners with information necessary to advocate: *The community forum was conducted to provide partners with information about how to understand and remediate environmental exposures.*

- Number of partners who understand and can share factual information about environmental health hazards: *XX partners participated in the forum, and based on surveys collected after the forum, XX% of those attending were able to identify key facts related to environmental public health hazards.*

For more information about the UC Center for Environmental Genetics, visit: https://med.uc.edu/depart/eh/centers/ceg/home [accessed 19 January 2021].

Chapter 4 Case Study: Teens, Nail Salon Workers, and Beauty Products

In Oakland, California, the **Asian Communities for Reproductive Justice** established the Participatory Research, Organizing, and Leadership Initiative for Safety and Health (POLISH) to decrease toxic occupational exposures among female Asian Pacific Islander (API) nail salon workers. The project organizers aimed to 1) educate, train and mentor API teenage girls and Vietnamese nail salon workers who are exposed to environmentally toxic products, and 2) increase scientific knowledge of the effects of exposure to environmental hazards associated with beauty products.

Activities

POLISH conducted outreach to 100 nail salons and two churches to recruit workers and distribute outreach materials written in Vietnamese. POLISH met every six weeks with nail salon workers and worker/owners interested in taking leadership on this issue. They gauged community knowledge of risks through a survey conducted by API youth, and they used the results to develop the program materials. The API youth who participated in this project developed and conducted a survey with 200 API girls on their knowledge of toxins in personal care products and the most popular products used by this community. POLISH created several products to communicate health messages, including a bilingual Vietnamese/English yoga manual on 10 easy ways to promote health in the workplace and a tutorial addressing spa chair cleanliness, one of the most common health and safety violations in salons. Based on interactions with and input from the API nail salon workers, the project leaders learned that participants needed information on safer product alternatives that they could use at work before they could change their risky practices.

Metrics:

- Description of target audience for communication: *Asian Pacific Islander female nail salon workers.*

- Number and description of target audience members who were involved in developing communication strategies: *XX API girls participated in the survey development and helped create the communication products.*

- Number and description of regularly scheduled meetings: *Meetings were scheduled every six weeks to educate nail salon workers about the environmental public health risks associated with the profession and to identify potential steps the nail salon workers could take to minimize their risk.*

Outputs

With support from an NIEHS extension grant, the project developed a basic health and safety resource handbook of the products of most concern to nail salon workers. Nail salon workers worked with partners to disseminate the handbook to nail salons throughout the community. In 2007, several API women took part in community-based participatory research training provided by POLISH that focused on developing communication products for nail salon workers. To increase physical access to the environmental public health messages, POLISH established a network to distribute materials throughout the salon community. As a next step, they are launching a public education campaign to promote the demand for and use of "Three-Free" products (free of toluene, formaldehyde, and dibutyl phthalates).

Metrics:

- Number and type of materials distributed: *POLISH created several products to communicate health messages, including a bilingual Vietnamese/English yoga manual on 10 easy ways to promote health in the workplace and a tutorial addressing spa chair cleanliness, one of the most common health and safety violations in salons.*

- Number of languages in which the products are available, especially the language of the target audience: *English and Vietnamese.*

Impacts

To date, 15 nail salon workers and worker/owners attend POLISH meetings regularly. They have learned to identify ways in which the California State Board of Barbering and Cosmetology can provide accessible and fair health and safety guidelines for the nail salon community. They also learned processes for licensing, inspections, violations, and appeals. The women who participated in the POLISH project gained increased scientific literacy and awareness of personal risk. The group of trainees developed a series of interactive exercises that educated many more Asian girls and boys at an API Youth Conference. Finally, the program was able to help advocates get an ordinance approved in San Francisco that recognizes salons that use the "Three-Free" nail products.

Metrics:

- Number of partner participants and attendees at these meeting and forums: *15 nail salon workers and worker/owners participate regularly in the meetings.*

- Description of audience understanding: *Nail salon workers learned to identify ways that the California State Board of Barbering and Cosmetology can provide accessible and fair health and safety guidelines for the nail salon community. They also learned processes for licensing, inspections, violations, and appeals.*

- Change in policy or regulation: *A new ordinance in San Francisco recognizes salons that use the "Three-Free" nail products.*

Summary of Product and Dissemination Metrics

Example Metrics for Activity 1: Develop communication strategies

- Description of goals and objectives of communication strategy.

- Description of target audience for communication.

- Description of communication channels most effective for audience and message.

- Number and description of target audience members who were involved in developing communication strategies.

- Description of methods of communication most frequently used by members of the intended audiences.

- Description of methods used to obtain feedback from the target audience on the communication strategy.

Example Metrics for Activity 2: Develop message content and format

- Number and description of messages developed about environmental health risks.

- Description of involvement of target audience in developing theme and content of message.

- Number of languages in which materials are available.

- Description of steps taken to address cultural context of target audience.

- Description of adaptations made to create products appropriate to different audiences.

- Number and description of print materials developed.

- Number and description of web-based products developed.

- Number and description of audio-visual products developed.

- Number and description of in-person products developed.

- Number and description of other types of products developed.

- Description of testing of message with target audience.

Example Metrics for Activity 3: Disseminate messages

- Description of dissemination plans.

- Number of channels or strategies used to disseminate products and messages.

- Description of plans for disseminating information during events, gatherings, or new events created to increase participation of audience.

- Number of events attended to disseminate products or materials.

- Budget allocated for dissemination activities.

- Number of products or materials distributed.

- Number of partners, volunteers, and community members disseminating materials (for example, number of individuals or hours spent disseminating).

- Number of target audience members who understand the message.

- Number of target audience members who have incorporated the message into their own beliefs, attitudes, and behaviors.

- Number of audience members who are able to spread the message to others.

Example Metrics for Activity 4: Follow-up and ongoing dissemination

- Number and descriptions of regularly scheduled meetings.

- Monthly newsletters or web-based outreach to inform target audiences of ongoing events.

- Weekly radio or television public service announcements.

- Number and description of forums created to increase and maintain participation.

- Survey results from participants about messages and dissemination techniques, including reports, fact sheets, or summaries of survey findings.

- Description of improvements made to content, format, and strategies.

- Description of methods used to engage target audience and other partners in improving the communication strategy, content, and format.

- Description of ways survey results were used to inform changes to dissemination strategies.

Example Metrics for Output 1: Findings communicated in various products

In-person interactions

- Number of and description of events attended such as health fairs, community forums, workshops, home health visits, meetings, focus groups, and one-on-one conversations.

- Description of national conferences and town hall meetings in which partners participated and communication products were disseminated.

- Number of partner participants and attendees at these meeting and forums.

- Number of questions asked during and after the meeting.

- Number and description of events held with government agencies, advocacy groups, and non-government officials.

- Number of materials picked up at the dissemination events.

Example Metrics for Output 1: Findings communicated in various products

- Number of partners organizing events to demonstrate involvement in the partnership.

- Number of contact hours of partners involved in research.

- Effectiveness of in-person meetings, established by feedback from participants.

Print materials

- Number of products and materials distributed.

- Number of requests made for the materials.

- Description or list of places distributed.

- Description or list of audiences receiving materials.

- Description of the target audience that received the materials and an indication of whether the audience reviewed the materials or forwarded them to other recipients.

- Co-authorship on materials (with a mix of partners as appropriate).

- Involvement of partners and target audiences in research translation for content.

- Effectiveness of products, established by feedback from product recipients and users.

Web-based products

- Number of hits to the website by originating sources of the hit (.edu, .gov, etc.).

- Number of hits to website by geographic areas.

- Number of third party links to the website.

- Number of downloads.

- Average and range of time users spend at website.

- Description or list of source sites that are driving users to the website.

- Amount of use of interactive websites (such as Web 2.0).

- Number and description of comments collected from web pages and blogs.

- Number of contributions collected (such as blogs, wikis, forums, etc.).

- Number of unique visitors.

- Page views per visitor (e.g., total time spent per user, frequency of visits, depth of visits).

- Description of activity on website discussion board.

- Effectiveness of products, established by feedback from product recipients and users.

Social media

- Number and demographics of members or followers.

- Number and description of messages sent.

- Number of people who open a message.

- Number of people who click on certain links within a message.

- Number of people who forward the message on to others; size of secondary audience.

Audio-visual products

- Number of products disseminated.

- Description of how product is tailored to audience.

- Description of type (such as podcast, YouTube video, film).

- Number of viewers.

- Pick up of the product by other media such as newspapers and TV.

- Number of discussions in newspapers, news television, YouTube.

- Number of discussions in social media.

- Traffic to and usage of products posted online or provided by other means.

- Interactions (such as leaving comments, participating in discussion forums, leaving reviews and ratings, etc.).

- Effectiveness of audio-visual products, established using feedback from product recipients and users.

Example Metrics for Output 2: Access to messages

Physical access

- Attendance at events.

- Number and description of written materials distributed.

- Number of views for videos or other media.

- Number of website hits.

- Number of home environmental health or promotora (community health worker) visits.

- Number of medical or household personal exposure interventions.

- Estimates of television and radio spot coverage based on time covered, number of listeners, or television coverage viewership.

- Number of target audience members who report having access to project-related information, products, or messages.

Conceptual access

- Number of languages in which the products are available, especially the language of the target audience.

- Description of efforts to explain scientific concepts in lay terms, as well as in terms that are meaningful for the target audience (e.g., describing specific respiratory symptoms might be more effective than discussing potential respiratory effects of environmental hazards).

- Description of how products and messages are consistent with cultural understandings of the target audience.

- Reports of understanding from target audience.

Example Metrics for Output 3: Multi-directional communication and engaged partners

Participation

- Reports of regularly scheduled meetings and interactions.

- Number of partners in attendance at formal and informal interactions.

- Number of members participating in community forums, website discussion groups, radio shows, or other interactive media.

- Types of partners participating in meetings.

- Diversity of partners by ethnic group, cultural group and geographic location.

Quality and equality of interactions

- Description of opportunities for partners to be heard.

- Description of exchanges that occur.

- Anecdotal evidence of ease of use and implementation of message.

- Number of new or revised products and dissemination techniques that were developed based on feedback from partners and the community.

Retention

- Retention rates of volunteers and partners who regularly disseminate material.

- Number of participants from the target audience or community at regularly scheduled meetings over time.

Consistency

- Frequency of reviews for consistency in messages and products.

- Description of procedures or actions for evaluating consistency in messages and products.

Example Metrics for Impact 1: Awareness of messages

- Results of post-intervention survey to test recall of messages.

- Description of audience understanding.

- Number of calls or requests for environmental health information from community over time.

- Number of articles or other media coverage by others that addresses the environmental public health message.

- Description of coverage in media of the environmental public health message.

- Trends of attendance and contributions at meetings over time (for example, community members with knowledge about the public health issue may be more likely to speak up at meetings and voice their concerns.).

- Individuals able to use language and ideas learned from products and dissemination.

Example Metrics for Impact 2: Ability to act on messages

- Description of changes in action, including quantitative results from assessments of behavior change.

- Anecdotal evidence of informed decision-making.

  – Description of testimonials, articles, etc.

  – Number of calls from community over time.

- Description of decisions made by trainees, students and participants because of increased awareness or education from program.

- Documentation of published changes in protocols, safety regulations, etc.

- Increased capacity of target audience to address environmental health issues.

  – Number of target audience members involved in PEPH projects.

  – Number of target audience members involved in PEPH leadership activities.

  – Number of new PEPH activities initiated

  – Description of relationships developed between target audience members and health professionals and decision-makers.

- Number and description of new programs to encourage identification and reporting of environmental or safety hazards.

- Number and description of new research projects, support groups, or enforcement committees established.

- Participation.

  – Number of individuals and partners taking action to change workplace, school, or community processes.

  – Number of situations where in messages and products.

- Description of procedures or actions for evaluating consistency in messages and products.

Example Metrics for Impact 3: Communication of messages to others

- Description of activities conducted to provide part-ners with information necessary to advocate.

- Number of partners who understand and can share factual information about environmental health hazards.

- Number of partners who actively advocate about environmental public health issues.

PRODUCTS AND DISSEMINATION